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ABSTRACT

Prepared by the Hawaii State Department of Education, this framework for environmental education is intended to guide teachers and administrators in their development of K-12 environmental education program guides and learning experiences. Included are objectives, a rationale, general concepts, environmental issues, and a scope and sequence model. (WB)

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a framework for environmental education

in the public schools of hawaii

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Governor, State of Hawaii

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PREFACE

Hawaii is a beautiful place, providing many and varied opportunities for enjoyment, comfort, happiness and self-realization. It is a small state, limited in land area and natural and energy resources. Because of our location many miles from continental U.S. and other countries, nearly all of our sources of energy and other life-sustaining goods must be imported. The dependent, limited nature of our state requires understanding and responsible action by our citizens to conserve and preserve what we have. At the same time, we must develop new and better ways of producing life-sustaining goods and energy and improve delivery systems and utilization of our resources. Developing effective planning and management systems is also essential. Only through environmental literacy and responsible action can our citizens continue to enjoy living in Hawaii.

There is need to develop environmental awareness, knowledge and commitment among our people to maintain the maximum level of quality of our total environment. The Department of Education has a major role in the achievement of these desired outcomes and should do this by providing necessary experiences in environmental education for our students.

The purposes of this framework are to state a rationale for environmental education, establish the program goal with objectives that range in difficulty from simple to complex leading to attainment of that goal, and to set forth a set of concepts and issues to be developed in the K-12 continuum. This framework sets the base from which program guides will be developed for a comprehensive environmental education program in our public schools. It is intended to be used by teachers and administrators as they plan environmental experiences for students.

Charles G. Clark, Superintendent

ACKNOWLEDGEMENTS

A Framework for Environmental Education in the Public Schools in Hawaii is the result of the time, talent and effort of the members of the Thematic Committee for Environmental Education. Experienced teachers, an elementary school principal, curriculum specialists, a program specialist, University of Hawaii personnel and community representatives made up the committee and worked diligently together to develop this document. The members of the committee are:

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Since the initial version of this document was drafted, many individuals within the Office of Instructional Services have been instrumental in its reformulation. Their generous reviews and comments have resulted not only in direct contributions of new thought, insights, and vision, but also in an expansion of the Framework's features brought about by diverse perspectives necessary in promoting a unity of purpose that is the essence of environmental education.

INTRODUCTION

Before the arrival of Captain Cook in 1779, the Hawaiian people had an established way of life that supported a population of at least 200,000. A stable ecology was maintained which was in part made possible by the careful use of a system of taboos which protected available land and ocean resources. The Westerners who later came to Hawaii did not share the same concern for ecological balance, for their culture tended to assume a future with unlimited resources.

Hawaii now has a population more than four times that of 200 years ago, and the way of life is radically different. Though history cannot be turned back, there does exist a need to retrieve the idea of human beings as a major part of the ecosystem. This problem of living within nature's limits faces all people of the world.

Hawaii is still a highly attractive place to live, but the future poses many environmental uncertainties. Hawaii's dependency on the outside world for much of its goods extends to even the food on our table. Our standard of living is based on one of the highest per capita levels of energy use in the world, and although the reserves of world oil are being rapidly depleted, imported oil serves as the major energy source for the entire economy. Oil prices and supplies are uncertain and can have profound impact on individual lifestyles, costs of living and such major industries as tourism.

Modern Hawaii has been built on many features transplanted from continental U.S. even though Hawaii has very different geographical characteristics. The importation of new plants, animals, and insects has often had a devastating effect on Hawaii's environment. Imported deer, goats, and cattle have had considerable adverse effects on plants and soil stability. Hawaii has more endangered indigenous species than any area in the world today and, in many cases, they are subject to destruction because they have not been able to compete with some of the exotics intentionally or accidentally introduced.

Oahu, as the most developed of the islands, shows some of the clearest examples of adverse environmental affects directly attributable to increased human activity. Kaneohe Bay has had its ecological system substantially altered in the last few decades through inadequate sewage disposal and top-soil runoff. Even smog has developed on Oahu and some public recreational areas are becoming health hazards because of water pollution.

On the other hand, an awareness of Hawaii's fragile ecology and special problems has resulted in some far-sighted environmental initiatives. Snakes have been effectively excluded; otherwise many poisonous varieties could plague Hawaii. Stringent quarantine measures have prevented the introduction of rabies protecting the health of people and animals. Viable mosquito and rodent controls have been effected. Hawaii was the first state to develop state land use legislation, and the watersheds have been protected to produce one of the world's purest water supplies. The visual pollution of unregulated billboards and advertising has long been controlled to help Hawaii avoid developing unsightly appearances.

In spite of increased population pressures and expanded human activities, what is fortunate for Hawaii is that many options for maintaining a high quality environment are still open. However, they could increasingly be cut off without sufficient planning; such planning being inextricably tied to public knowledge and public concern. Problem areas which need to be addressed include: land management, ocean and shoreline management; population ceilings and distribution; waste disposal and recycling; pollution control; housing; and even rights to visibility and cooling breezes.

Hawaii has some special frontiers. In the future, alternate energy sources may be found to replace much of Hawaii's present energy base-oil. Prospects of exploiting geothermal, biomass, solar, ocean thermocline and wind energies are better here than in many parts of the world. Hawaii not only can produce energy from these sources but can create knowledge and jobs by becoming a world center for research and development of alternative energy sources.

Environmental education can work in conjunction with many forms of planning, some of which are locally oriented, others which are regional, national, and/or global. Hawaii has already engaged in many forms of environmental education. The first citizens' Commission on the Year 2000 was created under state authorization to promote futurist thinking and planning. The Pacific Urban Studies and Planning Program at the University of Hawaii is an established graduate program and a new, undergraduate Environmental Studies program has been established which is coordinating its work with the College of Education and the Department of Education. The Governor created a Temporary Commission on Statewide Environmental Planning in 1973 which gave new directions to environmental planning. By 1977, the City and County of Honolulu expects to complete an important document, the General Plan for Oahu, which has received much public input.

Education about the environment is not new to the curriculum of Hawaii's schools; however, the efforts expended to date have been piecemeal. The time has come when our future rests on our ability to deal with environmental issues that plague our island society. In our democracy, action that speaks in the name of the citizenry requires the involvement of the citizenry. Thus is has become clear that the generation of students presently in our schools and those to come must be given a thorough understanding of the issues and the underlying principles directing individual and collective responsibility for the environment. This framework seeks to initiate a systematic approach to environmental education in our public schools.

A RATIONALE FOR ENVIRONMENTAL EDUCATION

Since the late 1960's there has been a heightened awareness of a host of problems stemming from uncontrolled technological impact on global ecology. These problems can be categorized into resource depletion, exploding human population, pollution of the global environment, inadequacy of environmental knowledge and others. Collectively these have become known as environmental

problems. Unlike many other societal problems that seem subject to solution, environmental problems threaten to become perennial. Further, there are already many aspects of these environmental problems which have become critical and many others which must at least be characterized as pressing. In some cases environmental problems threaten the survival of entire species, including our own. In others, they threaten to impair most of the quality of planetary life.

The profundity of these problems has brought about a national as well as a local call for educational programs that will prepare our citizenry to cope rationally and effectively with both current problems and those that may loom in the future.

OPERATIONAL DEFINITIONS

ENVIRONMENT

The term environment is variously used in educational, popular, and technical literature. Each use has particular meaning to a specific group and understanding of such particularities is a function of education. However, there are some broad characteristics of environment that can be identified which are in part or in whole common to most uses. These are:

- An environment is a place. It is a region, setting or context, real or imagined. It may be internal to an object or organism or external to it. It may be microscopic, macroscopic. It may be immediate surroundings or rest outside the reach of human beings.

- An environment is the contents of a place. These may be physical or the products of imagination. They may be biotic matter or abiotic matter, or energy and may or may not involve humans and their artifacts.

- An environment is the dynamic processes and interactions. These are the reciprocal interworkings of the contents of a place.

- An environment is bounded by time. This is the period necessary for processes and interaction to occur and this period may be in the past, future, or present.

- An environment is a conceptual framework. It is a perception of a reality shaped by culture, personal understanding and temperament.

- An environment is a totality. It is holistic, time bound reality including substance, energy, and processes of interaction, be they physical, biological, societal, or psychological.

ENVIRONMENTAL EDUCATION

Environmental education consists of formal and non-formal educational experiences and processes which enable humans to develop awareness and understanding of the environments within which they interact, skills in coping with environmental problems and positive attitudes which will help them to live in harmony with the environment.

Environment education is thematic in nature. It is interdisciplinary and multidisciplinary integrating such subject areas as science, social studies, mathematics, language and fine arts, health, physical education, and practical and industrial arts and such thematic areas as career and values education. Some environmental concepts and issues are already being taught in these subject and thematic areas.

STRUCTURE OF THE ENVIRONMENTAL EDUCATION CURRICULUM

GOAL

The goal of environmental education is to develop an environmentally literate and enlightened society which, through its ethical commitment to wise use of its resources, creates and maintains optimum quality in both human-made and natural environments.

OBJECTIVES

To achieve the goal of Environmental Education in Hawaii, it will be necessary to attain certain objectives during the period of formal education. No list can be assumed complete, for the dynamics of the environment suggest a need for constant re-evaluation and refurbishment. For this beginning stage, however, the following environmental education objectives can be stated and made to serve as focal points for the various school levels.

Objective 1. Students should develop awareness of themselves in relation to their environment and the need for wise use of the environment.

Subobjectives:

- Develop awareness of the grandeur, delicacy and beauty of the world in which we live.
- Develop awareness of change, past and present, and the agents of change working within environments.
- Develop awareness of the role played by humans and their artifacts within environments.

- Develop awareness of the capacities and limits of humans to control environments.
- Develop awareness of the effect of the environment on humans and humans' effect on the environment.
- Develop awareness of the role of social institutions in regulating human interaction within the environments.
- Develop awareness of the holistic interaction of physical and biological, chemical and mechanical factors within the environments.
- Develop awareness of the recreational opportunities of the environments.

Objective 2. Students should develop knowledge of the various aspects of the environment--land, water, sea, air, other eco-systems--and the relatedness of human beings, environmental concerns and the social, political, cultural and economic structures.

Subobjectives:

- Develop understanding of the academic disciplines that study aspects of environments.
- Develop understanding of the technologies that deal with the manipulation of environments and those that provide tools for regulation and control of such manipulation.
- Develop understanding of the natural principles that govern the interaction of the physical and biological, chemical and mechanical entities of the environments.
- Develop understanding of the principles of the applied realism of economics, politics, culture, law, and management which bear on environments.
- Develop understanding of the literature and history of human interaction within environments.
- Develop understanding of the aesthetic dimensions of human interaction within environments.
- Develop understanding of the influence of environments on individuals and cultures.
- Develop understanding of the occupational opportunities associated with environments.
- Develop understanding of the vehicles of participation in decisions pertaining to environments.

Objective 3. Students should develop skills in coping with environmental problems.

Subobjectives:

- Acquire skills in seeking knowledge about environments.
- Acquire skills in rational consideration of alternatives and making judgments concerning issues of environmental consequence.
- Acquire skills in selecting positive uses of the environments.

Objective 4. Students should develop attitudes which will help them to live in harmony with the environment.

Subobjectives:

- Develop a positive ethical stance concerning wise human use of environments.
- Develop a concern for and commitment to participation in actions necessary for the wise use of environments.

SCOPE AND SEQUENCE MODEL

The emphasis on the various components of the objectives differs with the age groups, developing from the simple to the complex. The main emphasis in learning for elementary school youngsters would be in developing awareness and knowledge about themselves and their relationships to their environment and issues therein. This base will help develop appropriate behavior. In the intermediate and earlier high school levels, with the base of awareness and knowledge, the emphasis would be in developing greater knowledge, skills in decision-making and coping with issues and problems related to the environment. Along with skills development, the students would be expected to acquire an ethical stance which would predispose appropriate behavior in relation to environmental concerns. In the later high school years students should acquire greater skills in handling more complex problems, a broader environmental ethic and develop a functional commitment to positive action in regard to their environment.

The scope and sequence model for environmental education curriculum is diagrammed below. The target populations to which the program is addressed are plotted on the vertical axis. The objectives are plotted on the horizontal axis. Degrees of emphasis among the varying grade levels are denoted by intensity of shading.

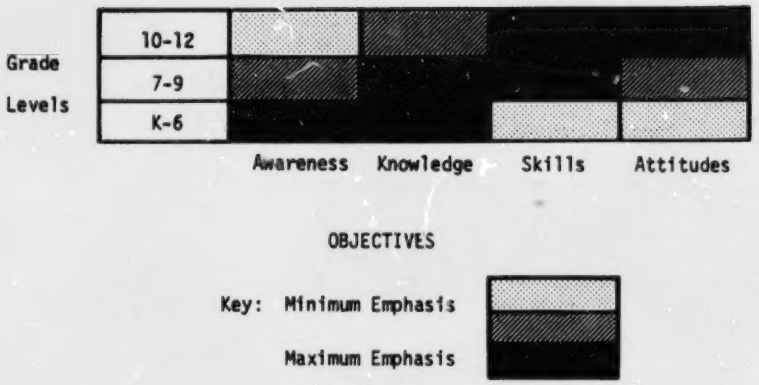


FIGURE 1

SCOPE AND SEQUENCE MODEL

Concepts and issues to be included in Environmental Education should meet two prerequisites. First, they should possess a high social value including intellectual importance and/or a high survival value. Second, all content should be considered appropriate for inclusion in formal schooling.

Using these criteria, it is possible to take a first cut at the development of a catalog of concepts and issues to be included in environmental education. This catalog is but a tentative listing contractible and expandable in the light of emerging environmental concepts and issues.

CONCEPTS

Concepts that are included tend to be enduring and possessed of a high degree of generalizability and universality.

The propelling need for environmental education results from the impact of technology on our ecology. Environmental education is a human creation and must be viewed from the human vantage point. Human beings transcend the rest of the animal kingdom and may be legitimately considered as an organism apart, because of the multitude of environments which they can enter either directly or indirectly through the control of artifacts or through the outreach of imagination. It is these environments that constitute the categories from which the content of environmental education is drawn. There are five categories--personal, social-intellectual, terrestrial, extraterrestrial, and total human environment. Examples of concepts associated with the categories are listed below.

- Personal Environment. The personal environment of humans encompasses both mind and body and the processes and interactions thereof. It is studied in human physiology and psychology. It creates immediate experience and expands to encompass personal knowledge, skills, and the regulators of personal action, conscience and ethical commitment.

1. I am a human and I am responsible for my:
   a. survival.
   b. personal power.
   c. consequence of actions.
   d. knowledge, skill, attitudes.
   e. sense of personal worth.
2. I am an actor and I am capable of:
   a. action or inaction.
   b. changing things over time.
   c. enhancing personal survival probability.
   d. consuming resources.
   e. intentional or unintentional action.
   f. knowing.
   g. judging quality.
   h. generating knowledge.
3. I am a social creature and have an ethical responsibility for:
   a. the quality of our common environment.
   b. institutional structures which bear on the environment.
   c. the artifacts that interact with the environment.
   d. educating others about the environment.
   e. my interdependence with others.

- Social-Intellectual Environment. The social-intellectual environment encompasses the substance and structures of relationships, both physical and intellectual, between humans. It is studied in sociology, economics, political sciences, law, aesthetics, cultural studies, literature, religion, etc. It is the set of institutions that bind human interaction and regulate their involvement with all other environments.

1. Social and intellectual agencies are human creations and as such should:

   a. be subject to continuous re-evaluation.

   b. promote human survival and increase the common quality of life.

   c. provide for responsible management of that part of the earth's environment within their control.

2. Social and intellectual agencies should generate:

   a. social, physical and biological knowledge that interprets and contributes to the creation of optimum present and future environments.

      1. Humans should continue to pursue the knowledge of social, physical, and biological principles to insure greater understanding of environments.

      2. Humans should continue to pursue knowledge on how to regulate their technology so that it operates to optimize ecological quality.

      3. Humans should educate their young in the history of their struggle to improve their quality of life so that lessons of the past are not lost.

      4. Humans should attempt to apply their knowledge of social, physical. biological principles to enhance their chances of survival and to maximize the quality of life.

   b. guides for interpersonal action which should:

      1. Account for the fact that individuals make different demands of their environment in accordance to their perceptions.

      2. Account for the fact that individuals have the potential to deal successfully with their environments according to the degree of intellectual growth they have attained.

      d. Allow individuals freedom to act within their own environment.

   c. procedures to resolve conflicting demands on the environment between individuals and groups.

   d. procedures for planning the optimum use of the environment by individuals and groups to improve the common quality of life.

   e. inducements to share equitably the costs and benefits of human use of the environment.

- Terrestrial Environments. Terrestrial environments encompass the biotic and abiotic components such as atmosphere, solid mass and water; biological components such as plants and animals; artifacts such as the creation of humans. There are cause and effect interactions between all components. These environments are studied in biology, chemistry, physics, geology, meteorology, oceanography, ecology, engineering, etc. This is the set of environments most often identified with environmental education.

  1. There is a constant interaction between the biological and physical entities of the earth's environment.

     a. The biological and physical resources of earth are limited.

     b. There are ecological limits to the biological carrying capacity of the earth.

     c. Renewable resources of the earth are primarily solar and biological.

     d. The matter of the earth can be transformed and recycled.

     e. The earth's principal energy source is the sun which drives most of the interaction between biological and physical entities.

     f. There are delicate balances in the character of the atmosphere, the earth's magnetic field, and other physical features of the earth that are essential to biological survival.

     g. Biological survival depends on quantitative and qualitative factors of the environment.

     h. The earth's environments have been and continue to be in a constant process of change.

  2. Humans interact both directly and indirectly through artifacts with biological and physical entities of their environment.

     a. Humans are animals and are subject to the natural laws that govern all animals.

     b. Artifacts are only partially controllable by humans.

     c. Humans can manage some biological and physical entities but such management is limited.

     d. Humans appear unique in their ability to develop extensive symbolic communication systems; to adapt to a vast variety of ecological niches; to produce artifacts which satisfy practical and aesthetic needs; to plan and create futures and reconstruct the past; to create technological devices and systems; and to create engines of self-destruction.

e. Human survival depends on quantitative and qualitative factors of the environment.

f. The rate of change within the earth's environment is accelerating through human activity.

g. Humans adapt to new environments, in part, through social change, but to ensure survival there needs to be a better balance between social change and technology.

h. Solutions to problems may be achieved through social and/or technological change, but some combinations can create more problems than they solve.

i. Humans through their technology are more rapacious consumers of resources than any other organism.

j. Humans respond to the aesthetic qualities of environments as well as to their utilization qualities.

- Extraterrestrial Environments. Extraterrestrial environments encompass all that is outside the earth, including the void of space, the solids and fluids of heavenly objects, any possible biological entities, the artifacts of humans--landers, capsules, space traveling humans and others. These are studied in chemistry, physics, geology, meterology, astronomy, biology, and engineering. These environments interact with all terrestrial environments through partial bombardment and the energies of the electromagnetic spectrum and gravitation. These are frontier environments.

  1. There is an interaction between the biological and physical entities of the earth and the gravitational energy sources of the universe.

  2. All the entities of the universe appear to interact in parallel to the workings of the microcosm, Earth, and on our solar system.

  3. Of all earth's creatures, only humans have the capacity to reach beyond the confines of the earth at their own will.

     a. Humans through their artifacts and personal venturing have the potential for affecting parts of the solar system and the reaches beyond.

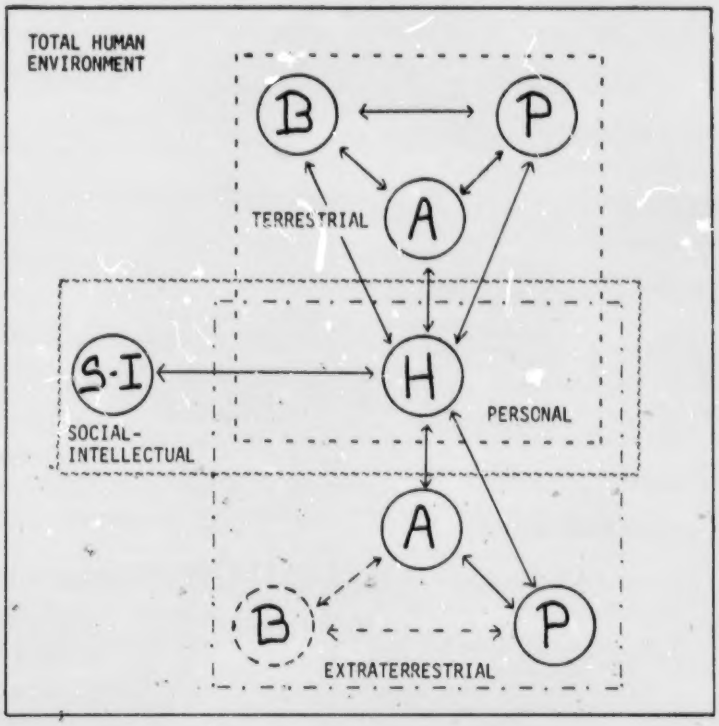
     b. The nature of the extraterrestrial environments is unknown in most of its dimensions and, therefore, a frontier to human interest.

     c. Space activities have given humans a new perception of their place in the universe, a sense of unity as earth beings and the finiteness of global earth.

Total Human Environment. The total human environment encompasses all the environments and their complete set of interactions. It is studied in totality in environmental education, as cosmology and metaphysics and in part through all other disciplines.

The totality of interactions of all environments constitute our total human environment.

Below is a diagram summarizing the five categories of environments, the components that interact in those environments, and the interactions between those components.



Symbols		Components
(H)	--	Human Being
(A)	--	Artifact
(B)	--	Biota
(P)	--	Physical
(S-I)	--	Social-Intellectual Agencies

Unproven Component
Unproven Interaction
Known Component
Known Interaction

FIGURE 2
THE FIVE CATEGORIES OF HUMAN ENVIRONMENTS

ISSUES

Commanding issues will be those that are normally immediate and pressing and of threat to survival or quality of life.

Though there are many subdivisions and topics with an almost endless array of examples, the following environmental issues are currently of major importance.

1. Human Populations - particularly the impact on global resources and the quality of human interactions.

2. Resource Depletion - most important the consumption of non-renewable resources.

3. Pollution - the toxic substances and noxious wastes, noise and thermal conditions that diminish environmental quality and/or life expectancy.

4. Management and Control - the problems of human governance of global problems associated with degradation of the environment.

5. Environmental Ethic - the development of global set of principles and practices to guide optimum interaction with the environment.

6. Public Concern - in most democratic societies there is an ever increasing need for citizen awareness and participation in the processes of environmental management, and decision-making.

7. Ecological Integrity - the preserving of the ecological system of the world in a condition necessary to optimize quality of global life.

Due to the changing nature of environmental issues, this must be considered as a beginning list. Emerging concerns manifested in public debates on environmental issues will certainly evolve into appropriate environmental education pursuits for the future.

ORGANIZATIONAL STRUCTURE FOR DELIVERY OF ENVIRONMENTAL EDUCATION IN THE PUBLIC SCHOOLS OF HAWAII

This framework constitutes the beginning of a comprehensive environmental education program for the public schools of Hawaii. This framework will serve to direct the development of a K-12 program guide for use in the schools. Preliminary plans have been made for the development of supplementary instructional and resource guides. A system for dissemination of locally and nationally produced materials will be designed to keep administrators, teachers, students, and the community informed of current activities in the field of environmental education. Plans for program administration, including assessment, evaluation, and improvement, and implementation of support services will be developed concurrently with the aforementioned activities.

Environmental education can never be a static program because change is a natural part of any environment. To be effective, environmental education must explore the concepts and issues which are constantly emerging; therefore, no program document can be considered a final product. Following dissemination, this framework and supplementary documents will be continuously evaluated and improved within the Department's Foundation Program Assessment and Improvement System (FPAIS).